

Observations of *Epicordulia princeps* (Hagen) (Odonata: Corduliidae) at a Light

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Abstract: The occurrence of *Epicordulia princeps* (Hagen), a crepuscular dragonfly common to the central and northeastern United States, at a street light was studied on successive evenings from June 18 to July 4, 1966 (11:00 PM to 1:30 AM—CST) in Chicago, Illinois. Both sexes were usually present with males always predominating. Curiously, the dragonflies repeatedly aggregated (loosely) on a certain portion of the illuminated surface (of stone wall) throughout the study period. Dragonflies arrived and departed singly with either process usually being accomplished, for all individuals present, within 20 minutes. It was not clear if the dragonflies, when attracted to the light, were actually foraging or whether perched (resting) on nearby trees and other suitable resting sites. An anomalous behavior of curving the abdomen upwards when perched on the wall was observed.

Corbet (1963), summarizing a large number of published studies, describes two general activity patterns in dragonflies: (1) regular flight activity from mid-morning through late afternoon (i.e., during the non-extreme daylight hours), and (2) regular flight activity at sunrise and sunset (eocrepuscular activity). Under the latter, crepuscular dragonflies are those which fly only at sunset, although probably the majority of these are also active at sunrise but have not yet been observed (due to a general deficit of extensive dawn studies) and for this reason, they are better known than eocrepuscular forms (Corbet, 1963). Generally, these dragonflies, the majority of which are tropical, possess extremely large compound eyes and dark bodies, are strong, rapid fliers and forest-dwelling (Williamson, 1923). Some crepuscular dragonflies are attracted to lights after sunset (Corbet, 1963).

Epicordulia princeps (Hagen) is a crepuscular dragonfly common to the central and northeastern United States with a flying season from early May through mid-September (as recorded in Ohio) (Needham and Westfall, 1955). The only other known species of the genus is *regina*, restricted to the southeastern United States and easily distinguished from *princeps* by wing markings (Needham and Westfall, 1955). There are apparently no published accounts of either species being attracted to lights after sunset and this paper reports some observations delegating such behavior to *princeps*.

OBSERVATIONS

On the evening of June 18, 1966, 4 individuals of *princeps* were seen resting on a stone wall illuminated by a street light, 8 feet away, on The University of Chicago campus. The wall, off-white in color, was 10 feet high and had a roughly-textured surface. Using a step ladder, the insects were easily picked up by hand and in this way, sex was determined quickly by examining genitalia.

TABLE 1. Occurrence of *E. princeps* on successive evenings in 1966.

Date	Females	Males	Total
June 18	1	3	4
June 19	0	5	5
June 20	0	0	0
June 21	2	6	8
June 22	2	5	7
June 23	1	6	7
June 24	1	4	5
June 25	1	3	4
June 26	0	0	0
June 27	0	0	0
June 28	2	6	8
June 29	2	6	8
June 30	1	5	6
July 1	1	4	5
July 2	0	5	5
July 3	1	2	3
July 4	0	3	3

The dragonflies were then returned to their approximate positions on the wall and thereafter left undisturbed (but observed) for the remainder of the evening. This preliminary observation was made at 11:25 PM (CST) and no more dragonflies arrived after that, with observation lasting until 2:18 AM. However, the 4 individuals had flown away before this time. For successive evenings thereafter, the illuminated section of wall was examined for *princeps* for a period of 2½ hours, from 11:00 PM to 1:30 AM, and the observed maximum frequencies are tabulated by sex in Table 1. In addition, on each evening, the times of arrival and departure were recorded for the dragonflies.

DISCUSSION

Evenings prior to the final observation date (July 4) for which no entries were made, were not cases of bad weather but simply instances of non-appearance. In addition, routine searches were made at other nearby illuminated areas but *princeps* never appeared. After July 4, the dragonfly did not appear at the study site for 24 consecutive evenings and after this, observations were terminated altogether. General climatic conditions had not changed very much after July 4. For some unknown reason, males always predominated (Table 1). After the first 2 evenings of observation, it became evident that the dragonflies tended to aggregate in a loose fashion within a certain area (with usually 5–8 inches to nearest neighbor) of about 10 square feet on the wall, and on the second evening, a faint crayon line was drawn to define this “preferred” area of illumination. On future evenings, all individuals perched within this circumscribed area. The reason for this repeated preference of a certain portion of the larger general area of illumination is not clear. Careful examination of the preferred area during daylight revealed nothing unusual. The dragonflies

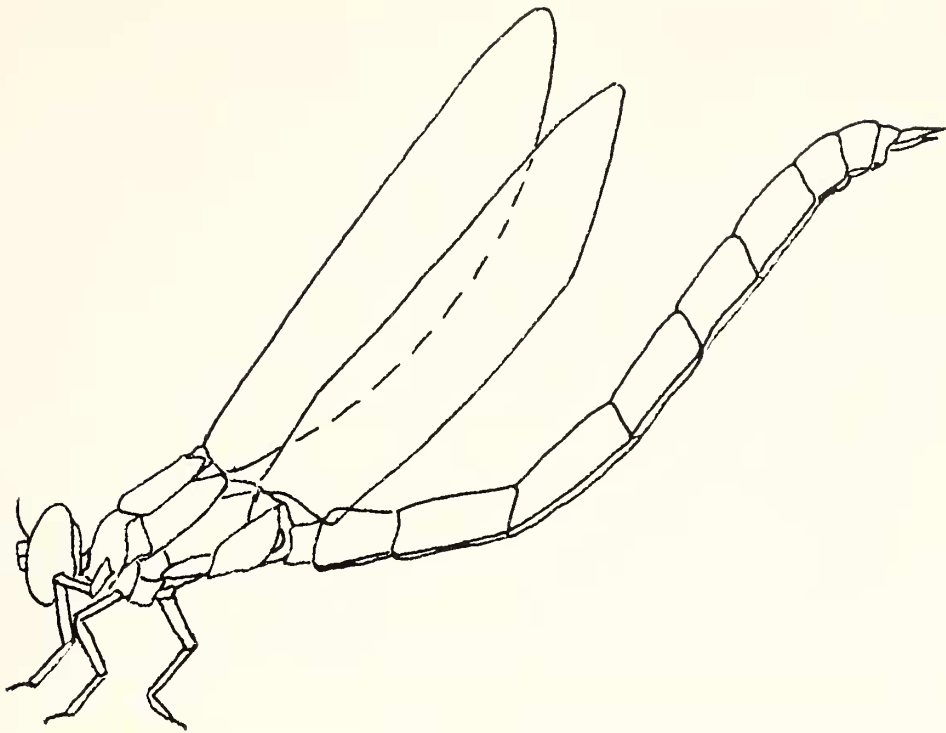


FIG. 1. Unusual position of the abdomen observed in both sexes of *E. princeps*.

were always positioned vertically on the wall with the anterior end upwards. Furthermore, the dragonflies never appeared to be disturbed when picked up (one at a time) for sex identification, for they always retained the motionless, resting position (wings held vertically to the long axis of the body) when returned. In reference to usual departure, most individuals left the wall (flew away) within 20 minutes, usually between 1:00–1:30 AM and never before 12:40 AM nor later than 1:55 AM. Arrival was similar to departure—individuals arrived singly and almost invariably between 11:00–11:40 PM.

It is interesting to note that *both* sexes were seen together with the absence of the usual breeding behavior exhibited by most dragonflies whenever both sexes are present at breeding sites during daylight hours. Corbet (1963) mentions that some dragonflies may fly in small groups comprised of both sexes when hunting food (as witnessed during daylight). Wright (1944) reports that in *princeps*, both sexes may fly together during daylight. Group hunting for food raises an interesting question concerning the observations presented here: were the dragonflies perched on a nearby tree or some similar resting site and merely attracted to the light or were they actually foraging during these late hours? Corbet (1963) mentions the likelihood of some crepuscular dragonflies flying well after sunset. Assuming that at least some of the same individuals were present on more than one evening, *a priori*, it seems unlikely that they always chose the same resting area every night and were therefore always attracted to the same light source. Rather, it is conceivable that the aerial region surrounding this light source was particularly attractive for foraging and that *princeps* was attracted to the light while in flight rather than at

rest. Foraging within close proximity of the attracting light source could have been enhanced by the following existing conditions: (1) intense attraction of other aerial insects to the light source, (2) abundance of small shrubs of many types near the light source which may have supported many aerial insects, and (3) small, shallow pools of water behind the wall which usually had minute aerial insects flying above them. This suggestion of foraging after dark is difficult to prove but nonetheless warrants mentioning. While the particular light source attractive to *princeps* was no different than other street lights in the area, possibly the surrounding, immediate conditions had something to do with the observed preference for it.

It was also observed that all individuals of *princeps* on any evening had their abdomens curved steeply upwards away from the wall, as schematically depicted in Figure 1. Extensive survey of dragonfly literature failed to uncover any previous observation of this curious behavior. Abdomens were held in this position throughout the perching period and its purpose (if any) is not at all clear.

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